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EXAMINER

WEBB, GREGORY E

ART UNIT	PAPER NUMBER
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1751

DATE MAILED: 05/31/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/659,190

Applicant(s)

TAKASHIMA, MASAYUKI

Examiner

Gregory E. Webb

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09102003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 03082004.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 1-10 are rejected under 35 U.S.C. 102(e) as being anticipated by Ikemoto (US6638694).

Concerning the copper wiring, Ikemoto teaches the following:

The materials of the inorganic substrate for the semiconductor devices to

be produced by the present invention may be conducting and semiconducting

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materials such as silicon, amorphous silicon, polysilicon, silicon oxide, silicon nitride, aluminum, aluminum alloys, copper, copper alloys, titanium, titanium-tungsten alloys, titanium nitride, tungsten, tantalum, tantalum compounds, tantalum alloys, chromium, chromium oxide, chromium alloys, indium-tin-oxide (ITO); compound semiconductors such as gallium-arsenic, gallium-phosphorus and indium-phosphorus; and glass for LCD substrate.(see cols. 9-10)

Concerning the basic compound, quaternary ammonium hydroxide and the tetramethylammonium hydroxide, Ikemoto teaches the following:

A quaternary ammonium hydroxide such as tetramethylammonium hydroxide (TMAH) may be preferably added to further enhance the removal of resist, particularly resist residues remaining after etching or ashing. The amount of TMAH, if used, is preferably 0.03 to 5% by weight based on the resist stripping agent.(see col. 9, lines 44-49)

Concerning the sugar alcohols, mannitol and the sugar alcohols, Ikemoto teaches the following:

The sugar alcohols may be threitol, erythritol, adonitol, arabitol, xylitol, talitol, sorbitol, mannitol, iditol, dulcitol and inositol.(see col. 9, lines 4-6)

Concerning the semiconductor, Ikemoto teaches the following:

The present invention relates to a resist stripping agent for use in fabricating circuits or forming electrodes on semiconductor devices for semiconductor integrated circuits or liquid crystal displays, and further to a process of producing semiconductor devices using the resist stripping

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agent.(see Field of Invention)

Concerning the optional alcohol solvent, Ikemoto teaches the following:

The alkanolamines usable as the additive amines may be aliphatic alkanolamines such as ethanolamine, N-methylethanolamine, N-ethylethanolamine, N-propylethanolamine, N-butylethanolamine, diethanolamine, triethanolamine, N-methyldiethanolamine, N-ethyldiethanolamine, isopropanolamine, diisopropanolamine, triisopropanolamine, N-methylisopropanolamine, N-ethylisopropanolamine, N-propylisopropanolamine, 2-aminopropane-1-ol, N-methyl-2-aminopropane-1-ol, N-ethyl-2-aminopropane-1-ol, 1-aminopropane-3-ol, N-methyl-1-aminopropane-3-ol, N-ethyl-1-aminopropane-3-ol, 1-aminobutane-2-ol, N-methyl-1-aminobutane-2-ol, N-ethyl-1-aminobutane-2-ol, 2-aminobutane-1-ol, N-methyl-2-aminobutane-1-ol, N-ethyl-2-aminobutane-1-ol, 3-aminobutane-1-ol, N-methyl-3-aminobutane-1-ol, N-ethyl-3-aminobutane-1-ol, 1-aminobutane-4-ol, N-methyl-1-aminobutane-4-ol, N-ethyl-1-aminobutane-4-ol, 1-amino-2-methylpropane-2-ol, 2-amino-2-methylpropane-1-ol, 1-aminopentane-4-ol, 2-amino-4-methylpentane-1-ol, 2-aminohexane-1-ol, 3-aminoheptane-4-ol, 1-amino-octane-2-ol, 5-amino-octane-4-ol, 1-aminopropane-2,3-diol, 2-aminopropane-1,3-diol, tris(oxymethyl)aminomethane,

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1,2-diaminopropane-3-ol, 1,3-diaminopropane-2-ol, and
2-(2-aminoethoxy)ethanol.(see col. 7, lines 33-68)

Concerning the optional sulfur solvent, Ikemoto teaches the following:

Of the above solvents, preferred are dimethyl sulfoxide,
N,N-dimethylformamide, N,N-dimethylacetamide, N-methylpyrrolidone,
diethylene glycol monomethyl ether, diethylene glycol monobutyl ether,
dipropylene glycol monomethyl ether and dipropylene glycol monobutyl
ether.(see col. 8, lines 51-55)

Concerning the saccharides, Ikemoto teaches the following:

The sugars may be monosaccharide having 3 to 6 carbon atoms such as
glycerin aldehyde, threose, arabinose, xylose, ribose, ribulose, xylulose,
glucose, mannose, galactose, tagatose, allose, altrose, gulose, idose,
talose, sorbose, psicose and fructose, and disaccharide such as trehalose.(see cols. 8-9)

Claims 1-10 are rejected under 35 U.S.C. 102(e) as being anticipated by Maruyama
(US6440326).

Concerning the copper wiring, Maruyama teaches the following:

The alkaline removing agents have high removing power to the photoresist
residue or the like compared with the acidic removing agents and have
lower corrosion power to the wiring pattern materials. However, in recent
hyperfine working technique, etching conditions of the wiring pattern

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materials become severe and the photoresist used in the etching tends to be deteriorated. Accordingly, the conventional alkaline removing agents have insufficient removing ability and the problem arises that the photoresist residue or the like remains on the inorganic substrate. Further, a width of the wiring pattern is narrower, therefore, it is required to reduce damages to the wiring pattern in a removing step. In this point of view, the conventional alkaline removing agents are also insufficient. Moreover, the conventional alkaline removing agent should be used at 80.degree. C. or more. Such high temperature results in volumes of vapor and mist, which is not desirable for a working environment.(see cols. 1-2)

Concerning the basic compound, Maruyama teaches the following:

Examples of the quaternary ammonium hydroxide used in the present invention include tetramethylammonium hydroxide, tetraethylammonium hydroxide, tetrapropylammonium hydroxide, tetrabutylammonium hydroxide, trimethylethylammonium hydroxide, dimethyldiethylammonium hydroxide, trimethyl(2-hydroxyethyl)ammonium hydroxide and triethyl(2-hydroxyethyl)ammonium hydroxide.(see col. 3, lines 1-10)

Concerning the sugar alcohols, mannitol, saccharides and the sugar alcohols, Maruyama teaches the following:

Examples of anticorrosives used in the present invention that in addition to protecting the inorganic substrate from corrosion also suppress the decomposition of the water-soluble amine thereby reducing the

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deterioration of the removal property of the resist removing composition include sugars such as glycerin aldehyde, threose, arabinose, xylose, ribose, ribulose, xylulose, glucose, mannose, galactose, tagatose, allose, altrose, gluose, idose, talose, sorbose, psicose and fruit sugar; or sugar alcohols such as threitol, erythritol, adonitol, arabitol, xylitol, talitol, sorbitol, mannitol, iditol and dulcitol. Among these sugars and sugar alcohols, glucose, mannose, galactose, sorbitol, mannitol and xylitol are preferable.(see cols. 3-4)

Concerning the quaternary ammonium hydroxide, Maruyama teaches the following:

Accordingly, the present invention provides a photoresist removing composition comprising the quaternary ammonium hydroxide, the water-soluble amine and the alkylpyrrolidone or a photoresist removing composition comprising the quaternary ammonium hydroxide, the water-soluble amine, the alkylpyrrolidone and the anticorrosive.(see col. 2, lines 54-59)

Concerning the semiconductor, Maruyama teaches the following:

FIG. 1 is a sectional view of a semiconductor device formed by dry etching using a photoresist layer 4 as a mask to form an aluminum pattern 3. In

FIG. 1, a semiconductor substrate 1 is coated with an oxide film 2, and a sidewall protective deposited layer 5 is formed upon the dry etching.(see fig. 1)

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Concerning the tetramethylammonium hydroxide, Maruyama teaches various composition containing TMAH in table 1-1.

Concerning the optional alcohol solvent, Maruyama teaches the following:

Examples of the water-soluble amine used in the present invention include an alkanolamine, a polyamine, a nucleophilic amine. Examples of the alkanolamine include an ethanolamine, an N-methylethanolamine, an N,N-dimethylethanolamine, an N-ethylethanolamine, an N,N-diethylethanolamine, propanolamine, an N-methylpropanolamine, an N,N-dimethylpropanolamine, 2-(2-aminoethoxy)ethanol, 2-amino-1-propanol and 1-amino-2-propanol.(see col. 3, lines 20-28)

Concerning the optional sulfur solvent, Maruyama teaches the following:

Examples of the alkaline removing agents include a removing agent comprising an addition product of ethylene oxide to an alkanolamine or a polyalkylenepolyamine, a sulfonic compound, and a glycol monoalkyl ether (Japanese Patent Application Laid-Open No. Showa 62(1987)-49355), and a removing agent comprising dimethyl sulfoxide as the main component, a diethylene glycol monoalkyl ether, and an organic hydroxyl compound containing nitrogen (Japanese Patent Application Laid-Open No. Showa 64(1989)-42653).(see col. 1, lines 55-65)

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Claims 1-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Iwata (US5846695).

Concerning the copper wiring, Iwata teaches the following:

Therefore, in order to solve the above problems, a removing agent which can easily remove films, layers, and residues of the photoresist and does not cause corrosion of the wiring material in the circuit is required.(see col. 2, lines 16-19)

Concerning the basic compound, Iwata teaches the following:

Examples of the quaternary ammonium hydroxide represented by the above formula include tetramethylammonium hydroxide, tetraethylammonium hydroxide, tetrapropylammonium hydroxide, tetrabutylammonium hydroxide, trimethylethylammonium hydroxide, dimethyldiethylammonium hydroxide, trimethyl(2-hydroxyethyl)ammonium hydroxide, triethyl(2-hydroxyethyl)ammonium hydroxide, tripropyl(2-hydroxyethyl)ammonium hydroxide, trimethyl(1-hydroxypropyl)ammonium hydroxide, and tributyl(2-hydroxyethyl)ammonium hydroxide.(see col. 3, lines 24-34)

Concerning the sugar alcohols, mannitol, saccharides and the sugar alcohols, Iwata teaches the following:

Examples of the sugar used in the present invention include monosaccharides and polysaccharides. Specific examples of the sugar include glycerol aldehydes having 3 to 6 carbon atoms, threose, arabinose, xylose, ribose, ribulose, xylulose, glucose, mannose, galactose, tagatose, allose,

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altrose, gulose, idose, talose, sorbose, psicose, and fruit sugar.

Examples of the sugar alcohol include threitol, erythritol, adonitol, arabitol, xylitol, talitol, sorbitol, mannitol, iditol, and dulcitol.(see col. 4, lines 10-19)

Concerning the quaternary ammonium hydroxide, Iwata teaches the following:

The concentration of the quaternary ammonium hydroxide is 0.01 to 20% by weight, preferably 0.1 to 10% by weight, of the whole solution. When the concentration of the quaternary ammonium hydroxide is lower than the specified range, the speed of removal of the photoresist is low. When the concentration is higher than the specified range, corrosion of the wiring material in the circuit cannot be prevented.(see col. 3, lines 40-45)

Concerning the semiconductor, Iwata teaches the following:

FIG. 2 shows a sectional view of a semiconductor integrated circuit obtained by ashing the layer of a resist 4 in the semiconductor integrated circuit shown in FIG. 1 with oxygen plasma to remove the layer of a resist 4.(see fig. 2)

Concerning the tetramethylammonium hydroxide, Iwata teaches the following:

Among these quaternary ammonium hydroxides, tetramethylammonium hydroxide (hereinafter, referred to as TMAH) and trimethyl(2-hydroxyethyl)ammonium hydroxide (hereinafter referred to as choline) are particularly preferable.(see col. 3, lines 34-39)

Concerning the optional alcohol solvent, Iwata teaches the following:

Specific examples of the hydrazine include hydrazine, methylhydrazine,

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1,1-dimethylhydrazine, hydrazinoethanol, and salts of these compounds.

Specific examples of the hydroxylamine include N-methylhydroxylamine, N,N-dimethylhydroxylamine, N,N-diethylhydroxylamine, and salts of these compounds.(see cols. 3-4)

Concerning the optional sulfur solvent, Iwata teaches the following:

Examples of the alkaline removing agent include a removing agent comprising an addition product of ethylene oxide to an alkanolamine or a polyalkylenepolyamine, a sulfone compound, and a glycol monoalkyl ether (Japanese Patent Application Laid-Open No. Showa 62(1987)-49355), and a removing agent comprising dimethyl sulfoxide as the main component, a diethylene glycol monoalkyl ether, and an organic hydroxy compound containing nitrogen (Japanese Patent Application Laid-Open No. Showa 64(1989)-42653).(see col. 1, lines 50-60).

Claims 1-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Tanabe (US5968848).

Concerning the basic compound, quaternary ammonium hydroxide, tetramethylammonium hydroxide and the optional alcohol solvent, Tanabe teaches the following:

Typical examples of hydroxylamines include hydroxylamine and N,N-diethylhydroxylamine. Typical examples of primary aliphatic amines

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include monoethanolamine, ethylenediamine, and 2-(2-aminoethylamino)ethanol. Typical examples of secondary amines include diethanolamine, dipropylamine, and 2-ethylaminoethanol. Typical examples of tertiary amines include dimethylaminoethanol, and ethyldiethanolamine. Typical examples of alicyclic amines include cyclohexylamine, and dicyclohexylamine. Typical examples of aromatic amines include benzylamine, dibenzylamine, and N-methylbenzylamine. Typical examples of heterocyclic amines include pyrrole, pyrrolidine, pyrrolidone, pyridine, morpholine, pyrazine, piperidine, N-hydroxyethylpiperidine, oxazole, and thiazole. Further, typical examples of lower-alkyl quaternary ammonium bases include tetramethylammonium hydroxide, trimethyl(2-hydroxyethyl)ammonium hydroxide(choline). Among these, aqueous ammonia, monoethanolamine, and tetramethylammonium hydroxide are preferred since they can be easily obtained and are safer.(see col. 4, lines 29-48)

Concerning the sugar alcohols, mannitol, saccharides and the sugar alcohols, Tanabe teaches the following:

Typical examples of saccharides include D-sorbitol, arabitol, mannitol, sucrose, and starch. Among these, D-sorbitol is preferred.(see col. 7, lines 27-29)

Concerning the optional ketone solvent, Tanabe teaches the following:

ketones such as acetone;(see col. 6, line 11)

Concerning the optional ester solvents, Tanabe teaches the following:

lactones such as .gamma.-butyrolactone, and .delta.-valerolactone; and(see col. 6, lines 25-26)

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Concerning the optional sulfur solvent, Tanabe teaches the following:

sulfoxides such as dimethyl sulfoxide;(see col. 6, line 12).

Claims 1-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Tanabe et al (US 5,905,063).

Tanabe teaches various compositions in table 1 which contain TMAH (basic compound) and D-sorbitol (sugar molecule).

Concerning the sugar alcohols, mannitol, saccharides and the sugar alcohols, Tanabe teaches the following:

Examples of the saccharides include D-sorbitol, arabitol, mannitol, sucrose, and starch. Among these, preferred is D-sorbitol.(see col. 5, lines 43-45)

Claims 1-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Sugihara (US5705089).

Concerning the copper wiring, Sugihara teaches the following:

High purity hydrofluoric acid (50% by weight), high purity hydrogen peroxide (30% by weight) and ultrapure water were mixed in proportions of 1:15:85 by weight, and one or more additives shown in Table 2 were further added to the resulting mixture to prepare a cleaning fluid. A precleaned silicon substrate of 3 inches in diameter was dipped in the cleaning fluid thus obtained at 30.degree. C. for 10 minutes for cleaning. After rinsed

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with ultrapure water, the substrate was air-dried. This was examined for analysis of the amount of iron or copper adhering thereto by using TREX (Total Reflection Energy Dispersive X-ray fluorescence). At the same time, surface tension of the cleaning fluid at 30.degree. C. and contact angle of the cleaning fluid to the substrate were measured. Further, the contents of iron and copper, respectively, in the cleaning fluid just after the preparation were determined by atomic absorption spectroscopy.

Results obtained are shown in Table 2.(see example 2)

Concerning the basic compound and the tetramethylammonium hydroxide, Sugihara teaches the following:

(b) 0.1 to 10 wt % of a base selected from the group consisting of an ammonia, hydroxyltrimethylammonium hydroxide and tetramethylammonium hydroxide, and(see claim 9)

Concerning the mannitol and the sugar alcohols, Sugihara teaches the following:

11. The cleaning fluid composition for cleaning a semiconductor substrate as claimed in claim 9 wherein said wetting agent is at least one member selected from the group consisting of ethylene glycol, glycerol, sorbitol, glycolic acid, erythritol, xylitol, and mannitol.(see claim 11)

Concerning the quaternary ammonium hydroxide, Sugihara teaches the following:

Next, examples of the wetting agent which can be used in the present invention include anionic surfactants such as sulfonic acid surfactants, sulfate surfactants, phosphate surfactants, fatty acid surfactants, and

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polycarboxylic acid surfactants, etc.; cationic surfactants such as amine surfactants, and quaternary ammonium salt surfactants, etc.; nonionic surfactants such as ethylene oxide added surfactants, ethylene oxide propylene oxide copolymer surfactants, and glycerol ester surfactants, etc.; etc. Also, there may be used fluorinated surfactants obtained by partially fluorinating the aforementioned surfactants. Further, any water-soluble organic additives that can improve the wetness of a cleaning agent on the surface of a substrate may be used as a wetting agent in the present invention. (see cols. 3-4)

Concerning the semiconductor, Sugihara teaches the following:

The present invention relates to a cleaning fluid for a semiconductor substrate. More particularly, the present invention relates to an improved cleaning fluid useful in cleaning a semiconductor substrate with a hydrogen peroxide cleaning fluid. (see Background of Invention)

Concerning the optional alcohol solvent, Sugihara teaches the following:

Specific examples of the water-soluble organic additive which can be used as a wetting agent in the present invention include alcohols such as ethanol, isopropanol, triethylene glycol monomethyl ether, and triethylene glycol monoethyl ether, etc.; glycols such as ethylene glycol, and propylene glycol, etc.; carboxylic acids such as acetic acid, propionic acid, and enanthic acid, etc.; hydroxycarboxylic acids such as glycolic acid, tartaric acid, and citric acid, etc.; polycarboxylic acids such as

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polyacrylic acid, polymethacrylic acid, polymaleic acid, and copolymerizate thereof, etc.; polyhydric alcohols such as glycerol, sorbitol, and polyvinyl alcohol, or their oxidants, etc.; and the like.(see col. 4, lines 5-15)

Concerning the optional ketone solvent and the saccharides, Sugihara teaches the following:

13. The cleaning fluid composition of claim 9, wherein said oxidation product is a member selected from the group consisting of glycol aldehyde, glycolic acid, glyoxal, oxalic acid, glyceric acid, glycose, tartaric acid, dioxyacetone and fructose.(see claim 13).

Claims 1-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Hasemi (US5567574).

Concerning the copper wiring, Hasemi teaches the following:

In recent years, the etching conditions of the wiring material are more and more strict with a tendency that a wiring process becomes ultrafine, so that the used photoresist tends to bring about the change in quality.

Hence, the releasing properties of the above-mentioned acidic removing liquid and alkaline removing liquid are insufficient, with the result that there is a problem that the photoresist remains on the inorganic substrate inconveniently.(see col. 2, lines 9-16)

Concerning the basic compound and the quaternary ammonium hydroxide, Hasemi teaches the following:

In the present invention, a quaternary ammonium hydroxide represented by

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the general formula $[(R^{sup.5})_{sub.3} N - R^{sup.6}]^{sup.+} OH^{sup.-}$ can be used, if necessary. Examples of the quaternary ammonium hydroxide include tetramethylammonium hydroxide, tetraethylammonium hydroxide, tetrapropylammonium hydroxide, tetrabutylammonium hydroxide, trimethylethylammonium hydroxide, dimethyldiethylammonium hydroxide, trimethyl(2-hydroxyethyl)ammonium hydroxide and triethyl(2-hydroxyethyl)ammonium hydroxide.(see col.4, lines 45-55)

Concerning the sugar alcohols and the saccharides, Hasemi teaches the following:

Examples of a sugar which can be used in the present invention include monosaccharides and polysaccharides, and typical examples of these sugars include glycerin aldehydes having 3 to 6 carbon atoms, threose, arabinose, xylose, ribose, ribulose, xylulose, glucose, mannose, galactose, tagatose, allose, altrose, gulose, idose, talose, sorbose, psicose and fruit sugar.(see col. 4, lines 23-29)

Concerning the mannitol and the sugar alcohols, Hasemi teaches the following:

Of these sugars and sugaralcohols, glucose, mannose, galactose, sorbitol, mannitol and xylitol are preferable from the viewpoints of solubility, decomposability and the like.(see col. 4, lines 33-35)

Concerning the semiconductor, Hasemi teaches the following:

FIG. 2 shows a sectional view of a semiconductor device in which the resist film 4 has been removed by resist ashing the semiconductor device in FIG. 1 with an oxygen plasma.(see fig. 2)

Concerning the tetramethylammonium hydroxide, Hasemi teaches the following:

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Of these quaternary ammonium hydroxides, tetramethylammonium hydroxide (TMAH) and trimethyl(2-hydroxyethyl)ammonium hydroxide are particularly preferable.(see col. 4, lines 45-55)

Concerning the optional alcohol solvent, Hasemi teaches the following:

In the present invention, examples of alkanolamines, alkoxyalkylamines and alkoxyalkanolamines represented by the general formula $R^{sup.1} R^{sup.2} --NC.sub.m H.sub.2m OR^{sup.3}$ include ethanolamine, N-methylethanolamine, N,N-dimethylethanolamine, N-ethylethanolamine, N,N-diethylethanolamine, propanolamine, N-methylpropanolamine, N,N-dimethylpropanolamine, N-ethylpropanolamine, N,N-diethylpropanolamine, 2-methoxyethylamine, 2-ethoxyethylamine, 3-methoxypropylamine, 3-ethoxypropylamine, 2-(2-aminoethoxy)ethanol, 2-(2-aminoethoxy)propanol, 2-amino-1-propanol and 1-amino-2-propanol.(see col. 3, lines 45-58)

Concerning the optional sulfur solvent, Hasemi teaches the following:

On the other hand, examples of the alkaline removing liquids include a removing agent comprising an ethylene oxide adduct of an alkanolamine or a polyalkylene polyamine, a sulfone compound and a glycol monoalkyl ether (Japanese Patent Application Laid-open No. 49355/1987) and a removing agent comprising dimethyl sulfoxide as a main component, a diethylene glycol monoalkyl ether and a nitrogen-containing organic hydroxy compound (Japanese Patent Application Laid-open No. 42653/1989).(see col. 1, lines 50-60).

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Claims 1-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Aoyama (US5174816).

Concerning the basic compound, Aoyama teaches the following:

2. The surface treating agent as claimed in claim 1, wherein the quaternary ammonium hydroxide is at least one member selected from the group consisting of tetramethylammonium hydroxide, tetraethylammonium hydroxide, tetrapropylammonium hydroxide, trimethylethylammonium hydroxide, trimethyl(2-hydroxyethyl)ammonium hydroxide, triethyl(2-hydroxyethyl)ammonium hydroxide, tripropyl(2-hydroxyethyl)ammonium hydroxide and trimethyl(1-hydroxypropyl)ammonium hydroxide.(see claim 2)

Concerning the sugar alcohols, mannitol, saccharides and the sugar alcohols, Aoyama teaches the following:

The sugar to be used in combination with the above quaternary ammonium hydroxide includes saccharides such as monosaccharide and polysaccharide.

Specific examples are glyceric aldehyde having 3 to 6 carbon atoms, threose, erythrose, arabinose, xylose, ribose, ribulose, xylulose, glucose, mannose, galactose, tagatose, allose, aldose, gulose, idose, talose, sorbose, psicose, and fruit sugar. Specific examples of the sugar alcohol are threitol, erythritol, adonitol, arabitol, xylitol, talitol, sorbitol, mannitol, iditol, and dulcitol. Of these compounds, saccharides

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such as glucose, mannose and galactose, and sugar alcohols such as sorbitol, mannitol and xylitol are suitable from viewpoints of solubility or dispersibility, and so forth.(see col. 3, lines 21-34)

Concerning the quaternary ammonium hydroxide, Aoyama teaches the following:

The quaternary ammonium hydroxide is used in a concentration of 0.01 to 15% by weight, preferably 0.05 to 10% by weight based on the weight of the total solution. If the concentration of the quaternary ammonium hydroxide is too low, the desired effects cannot be obtained, and if the concentration is too high, etching of aluminum itself undesirably proceeds.(see col. 3, lines 14-20)

Concerning the semiconductor, Aoyama teaches the following:

The present invention relates to a surface treating agent for an aluminum line pattern substrate and more particularly to a surface treating agent comprising an aqueous solution of quaternary ammonium hydroxide and sugar or sugar alcohol, which prevents after-corrosion of an aluminum pattern on a semiconductor substrate, i.e., corrosion of the aluminum pattern due to chlorine.(see col. 1, lines 5-15)

Concerning the tetramethylammonium hydroxide, Aoyama teaches the following:

The test wafer (A) of Example 1 was measured for aluminum etching rate at 25.degree. C. using choline in place of TMAH of Example 1. As shown in Table 3 below, results similar to those of TMAH were obtained.(see example 2).


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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregory E. Webb whose telephone number is 571-272-1325. The examiner can normally be reached on 9:00-17:30 (m-f).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yogendra Gupta can be reached on 571-272-1316. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Art Unit 1751

gew